

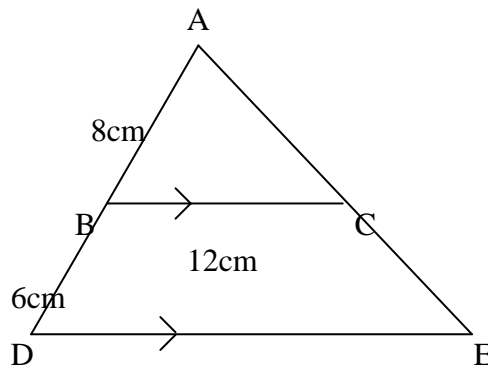
National 5

Homework RE14

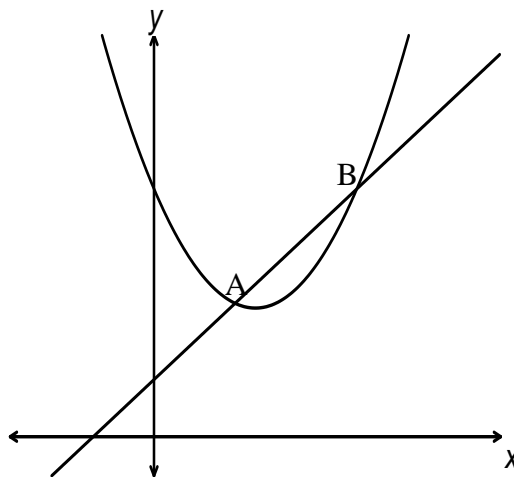
1. These two triangles are mathematically similar. The smaller one has base 20cm and the larger one has base 24cm. The larger triangle has area 180cm^2 . Calculate the area of the smaller one.



2. A small tube of toothpaste is 12cm long, and a large tube is 15cm long. If the tubes are mathematically similar and the cost depends on the volume, how much will the large tube cost, if the small one costs £1.60?
3. Use similar triangles to calculate the length of DE in the diagram below.



4. Find algebraically the coordinates of A and B where the line and curve intersect in the diagram below.
- The parabola has equation $y = x^2 - 5x + 13$ and the straight line has equation $y = 2x + 3$.



5. Express with a rational denominator:

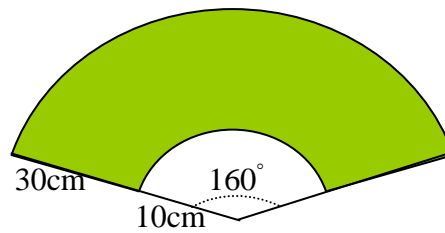
(a) $\frac{5}{\sqrt{3}}$

(b) $\sqrt{\frac{4}{9}}$

(c) $\frac{15}{2\sqrt{5}}$

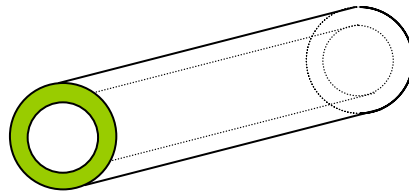
(d) $\sqrt{\frac{3}{24}}$

6. A windscreen wiper has a rotating arm 40cm long. The rubber blade is fixed to the outer 30cm of the arm. The arm rotates through an angle of 160° . Find the area of the windscreen wiped by the rubber blade.



[Diagram not to scale.]

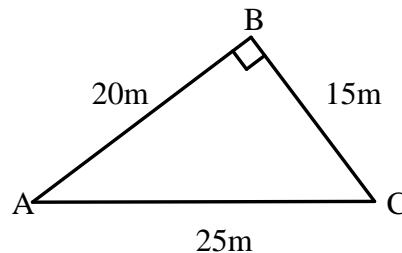
7. The pipe sketched below is made of metal which weighs 6.5 grams per cubic centimetre. The radius of the outer cylinder is 6cm and the radius of the inner cylinder is 5cm. Find the weight in kilograms of a 10 metre length of the pipe.



8. In a Fibonacci sequence, each term is made by adding the previous two terms. For example, choosing 1 and 3 as the first two terms, we get the sequence

1, 3, 4, 7, 11, 18, 29,.....

- (a) Write down a Fibonacci sequence of your own, and show that the sum of the first six terms is equal to four times the fifth term.
 (b) Prove that this is true for **any** Fibonacci sequence by continuing the Fibonacci sequence starting with a and b as the first two terms.
9. Triangle ABC is right-angled at B. The lengths of the sides are as shown.



- (a) Calculate the area of triangle ABC.
 (b) Using your answer to (a), calculate the length of BD in the triangle sketched below.

